

## SYRINGE FEEDING VERSUS BOTTLE FEEDING; IMPACT ON BREAST FEEDING

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### ABSTRACT

**Objective:** To compare the effects of syringe feeding versus bottle feeding on subsequent breast feeding in term infants admitted to the nursery for routine care for the first 12–24 hours of life.

**Study Design:** Prospective cohort study.

**Place and Duration of Study:** Nurseries of Combined Military Hospital Gujranwala and Mangla, from Feb 2016 to Jul 2016.

**Patients and Methods:** All term neonates fulfilling inclusion criteria were included in the study. All neonates admitted for observation delivered by lower segment caesarean section to the nursery at CMH Gujranwala were placed in group 1. They were initially syringe fed while being observed in nursery (12-24 hours) and subsequently advised to start breast feeding. Whereas all neonates admitted for observation to the nursery at CMH Mangla were placed in group 2. They were initially bottle fed and subsequently advised to breast feed. All infants were followed up at 1.5 months to determine feeding practices. At follow-up, infants were categorised as either exclusively breast fed or not exclusively breast fed.

**Results:** In group 1, 62.2% of infants were exclusively breast feeding at 1.5 months. In group 2, 59% of infants were exclusively breast feeding at 1.5 months. Group 1 did not have a significantly higher number of infants who were exclusively breastfed as compared to group 2 ( $p$ -value 0.64).

**Conclusion:** Supplementary feeding with syringe feeding as compared to bottle feeding does not confer any benefit in establishing exclusive breastfeeding in healthy term infants who are unable to breast feed for initial 12-24 hours and hence cannot be recommended as the preferred method of supplementary feeding in this group of neonates.

**Keywords:** Bottle fed, Exclusively breast fed, Syringe feeding.

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### INTRODUCTION

United Nations International Children's Emergency Fund (UNICEF) and the World health organization (WHO) recommend exclusive breast feeding for the first six months of an infants life<sup>1</sup>. Breast fed infants are less likely to suffer from serious illnesses including gastroenteritis, asthma, eczema, respiratory infections, pneumonia, ear infections, otitis media and sudden infant death syndrome<sup>2-4</sup>. Breast feeding is also beneficial in neuro-development of the infants<sup>5,6</sup>. Furthermore, in mothers, it is associated with enhanced bonding

to the infant, reduced risk of breast and endometrial cancer, increased duration of post-partum amenorrhea and subsequent child spacing<sup>7</sup>. Hence breast feeding is associated with obvious benefits to both maternal and child health.

The ideal way for infants to receive breast milk is through sucking at the breast. In order to achieve this Baby Friendly Hospital Initiative was launched<sup>8</sup>. This encourages mothers to initiate breast feeding within one hour of birth. It also discourages the use of pacifiers or artificial nipples. Unfortunately, this is not always possible. As a common practice, babies delivered by LSCS in many hospitals of Pakistan are sent to the nursery whereas mothers are kept under observation in post-surgical wards for a short period of observation lasting 12-24 hours.

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Under these conditions rooming-in and early breast feeding is difficult.

During this period the neonates are offered formula feeds. Formula feeds are provided as either bottle or cup feeds. In resource limited environments often there are no specialized well baby nurseries. Hence it is difficult and time consuming to cup feed all of these babies and it is a common practice to offer the initial feed by bottle. Subsequently these babies are bottle fed for a short period of time. It is a well-established fact that bottle feeding in neonates is associated with nipple confusion leading to difficulty in establishing breast feeding<sup>9</sup>. In order to breast feed the neonate needs to latch on and uses a different set of muscles as compared to bottle feeding<sup>10</sup>.

The method more closely mimicking breast feeding is cup feeding. Hence it was inferred that infants who are cup fed are more likely to breast feed<sup>11-13</sup> and the use of bottles or artificial nipples is discouraged<sup>14,15</sup>. However, when improperly practiced milk is poured in to the infants mouth rather than allowing him to lap it. Studies have reported that that improper technique can cause bradycardia, apnoea or low oxygen saturation or choking resulting in prolonged hospital stay<sup>16</sup>. Furthermore such methods are time consuming and require specialized care. Recent studies concluded that cup feeding as compared to bottle-feeding did not offer any advantage in exclusive breast-feeding later on<sup>17,18</sup>.

In our study, as an alternative to cup feeding, syringe feeding was offered to newborns. It was hypothesised that with syringe feeding it would be possible to control the amount of feed being given. This would avoid the risk of choking and aspiration associated with cup feeding while at the same time avoiding bottle feeding. Later on these infants can easily be shifted to breast feeding.

The objective of this study is to determine if the rate of exclusive breast feeding is significantly higher with syringe feeding versus bottle feeding of healthy term infants routinely detained in

nurseries for 12-24 hours. This would help to formulate evidence based guidelines on best practices in resource limited environments like Pakistan.

## **MATERIAL AND METHODS**

It was a prospective cohort study conducted simultaneously at the nurseries of CMH Gujranwala and CMH Mangla from February 2016 to July 2016. Permission was taken from the respective hospital ethical review committees. As no intervention was done and already established practices in vogue in the nurseries were being studied, there was no danger of any unethical practice during the research.

Appropriate sample size was calculated using World Health Organization (WHO) sample size calculator. The sample size required was calculated on the basis of 80% power and 0.05  $\alpha$  to detect at least a 65% probability that a randomly chosen participant from the syringe fed group had a superior outcome when compared with that for a randomly chosen participant from the bottle fed group. On the basis of these parameters, it was estimated that a final sample size of at least 180 participants (90 per group) completing the study would be needed to achieve adequate power after accounting for any dropouts.

All babies born by LSCS were included in the study. Any neonate detained for more than 24 hours, weighing less than 2.5 and more than 4 kg or requiring specialised feeding techniques (e.g. cleft palate etc.) was excluded. A total of 198 neonates were included by non-probability consecutive sampling technique (98 in group 1 and 100 in group 2).

All neonates in group 1 were syringe fed and observed for 12-24 hours. Similarly all neonates in group 2 were bottle fed and observed. Feed was administered by trained nursing staff. All neonates able to tolerate feeds were then handed over to the mothers. Mothers were counselled to breast feed at the time of handing over the neonates and observed for breast feeding in the next 24 hours. Any mother failing to breast feed

was guided accordingly. The mother and baby were then discharged the next day.

All patients were re-interviewed at 1.5 months when they presented for 2nd dose of routine immunization.

Demographic data regarding sex and weight was recorded in a predesigned proforma.

SPSS version 16.0 was used to analyse the data. Mean and standard deviation was used to describe weight. Frequency and percentage were used to describe gender and feeding practice at 1.5 months. Chi square test was used to compare the two groups. A *p*-value of 0.05 was considered significant.

## RESULTS

A total of 198 patients were included in the

breast fed i.e. either both breast and bottle feed or exclusively bottle fed. In group 1, 61 (62.2%) of infants were exclusively breast and in group 2, 59 (59%) of infants were exclusively breast feeding at 1.5 months. Group 1 did not have a significantly higher number of infants who were exclusively breast fed as compared to group 2 (*p*-value 0.64), as shown in table-III. The relative risk for bottle fed infants ending exclusive breast-fed as compared to syringe fed infants is 1.01 (95% CI = 0.82; 1.24).

## DISCUSSION

Yilmaz et al in his study compared the effects of cup feeding to bottle feeding on breast feeding in preterm infants and noted that cup feeding significantly increased the likelihood of late preterm infants being exclusively breast fed

**Table-I: Frequency distribution of male and female in the two groups.**

	Gender		Total	<i>p</i> -value
	Male n(%)	Female n(%)		
Group 1 Syringe fed n(%)	53 (54.1%)	45 (45.9%)	98	0.77
Group 2 Bottle fed n(%)	54 (52%)	48 (48%)	102	
Total	106	93	200	

Chi-square test was used to compare the frequency distribution of the two genders between the two groups.

**Table-II: Mean weight and standard deviation of the groups and *p*-value.**

	Mean weight $\pm$ SD (kg)	<i>p</i> -value
Group 1 Syringe fed	3.02 $\pm$ 0.32	0.27
Group 2 Bottle fed	3.08 $\pm$ 0.24	

The two sample t-test was applied to compare the mean weight of the infants between the groups.

**Table-III: Group/Follow up cross tabulation.**

Feeding practice at 1.5 months	Exclusively breast fed	Not exclusively breast fed	Total
Group 1, syringe fed	62.2% (61)	37.8% (37)	98
Group 2, bottle fed	59% (59)	41% (43)	100
Total	120 (60.6%)	78 (39.4%)	198

study. Group 1, (syringe fed babies) had 98 patients including 45 (45.9%) females and 53 (54.1%) males, as shown in table-I. Mean weight of babies was 3.02 with a SD of 0.3 kg. Group 2, (Bottle fed babies) had 100 patients of which 48 (48%) were females whereas 52 (52%) were male. Mean weight of babies was 3.08 with a SD of 0.24 kg, as shown in table-II. At 1.5 months, a total of 120 (60.4%) infants were exclusively breast fed while 78 (39.4%) were not exclusively

at discharge, 3 and 6 months<sup>11</sup>. Moreover cup feeding did not increase the length of hospital stay. He recommended cup feeding as a transitional method to breast feeding in late preterm infants during hospitalization. Nyqvist et al recommended that alternatives to bottles should be used until breast feeding is well established<sup>14</sup>. Huang et al also suggested supplementation with cup feeding as a substitute for bottle feeding to promote breast feeding<sup>12</sup>.

However, Rocha et al showed that there were no significant differences between infants who were cup fed or bottle fed as regards to the time spent feeding, feeding problems, weight gain or breast feeding prevalence at discharge or at 3 months follow up<sup>18</sup>. Similarly, Flint et al in a recent Cochrane review comparing cup feeding versus other forms of supplemental enteral feeding for new-born infants unable to fully breastfeed concluded that there was no reliable evidence to suggest that cup feeding confers a benefit over bottle feeding in maintaining breast feeding beyond hospital discharge in new-born infants<sup>17</sup>. In fact cup feeding was associated with poor compliance and a longer length of stay in the hospital.

These studies were carried out in neonates requiring relatively longer stays in the nursery of 24 hours or more. In our case the neonates were detained for a very brief period of 24 hours or even less. In most cases the babies were handed over to attendants rather than the mother. As cup feeding versus bottle feeding is infrequently practiced in Pakistan few people are aware with the correct technique. Improper cup feeding technique has been shown to cause aspiration, spillage and complications leading to prolonged hospital stay.

Hence it appeared appropriate to hand over the babies to the attendants on a technique they were more familiar and comfortable with. As an alternative, syringe feeding was offered to neonates and compared to bottle feeding as a control in our study with exclusive breast feeding at 1.5 months as the end point. However, our results showed that syringe feeding did not offer any significant benefit over bottle feeding in establishing exclusive breast feeding in the infants.

Although syringe feeding more closely mimics breast feeding as compared to bottle feeding and in addition it is easier and safer to practice when compared to cup feeding, a number of other factors like antenatal and post natal support, rooming in and early skin to skin

contact may play a more important role in establishing exclusive breast feeding. Our study agrees with the results of the recent Cochrane review that emphasises the role of factors other than mode of supplementary feeding in establishing exclusive breast feeding.

## CONCLUSION

Supplementary feeding with syringe feeding as compared to bottle feeding does not confer any benefit in establishing exclusive breastfeeding in healthy term infants who are unable to breast feed for initial 12-24 hours and hence cannot be recommended as the preferred method of supplementary feeding in this group of neonates.

## CONFLICT OF INTEREST

This study has no conflict of interest to declare by any author.

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